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## Fastening means for laminated glass panes

The invention refers to a fastening means for laminated glass panes according to the preamble of claim 1.

Such fastening means for laminated glass panes are required in statically or dynamically loaded buildings, the laminated glass panes being fastened by at least one clamping element and a supporting structure.

In statically or dynamically loaded structures, the laminated glass panes are mounted by means of holders or clamping or spot fasteners, respectively. Statically and/or dynamically loaded glass structures are, for example, overhead glazing for roofs, glass walls, facades or all-glass doors. In these cases, the laminated glass pane is pressed against a supporting structure by means of a clamping holder, e.g. designed as a laminar clamping holder or provided in a drill hole. If these laminated glass panes are equipped with an additional cover glass pane, e.g. a cover glass pane provided with electrically conductive, transparent conductor paths, the clamping pressure on the laminated glass pane causes the delamination of the additional cover glass pane. The additional layer makes the overall structure of the laminated glass softer so that the clamping forces for such a laminated glass cannot be calculated exactly, with the result that such laminated glass panes are not allowed for statically and dynamically loaded structures.

It is an object of the invention to provide a fastening means for laminated glass panes that allows for a reliable fastening of the laminated glass pane in statically and dynamically loaded structures, even if an additional cover glass pane is used.

The object is solved with the features of claim 1.

The invention advantageously provides that the laminated glass pane comprises a statically and dynamically loadable supporting glass pane and at least

one cover glass pane connected with the supporting glass pane by means of a layer of cast resin, the cover glass pane being provided with electrically conductive transparent conductor paths, wherein the at least one clamping element exerts a clamping force for fastening the laminated glass pane only on the supporting glass pane of the laminated glass pane.

In principle, a glass structure is selected as the supporting glass pane, which is officially approved, e.g. a hardened single pane in case of an all-glass door, or a laminated glass in PVB foil with hardened or non-hardened single panes, e.g. in fall-safe glazing and overhead glazing.

Using cast resin, a cover glass pane with electrically conductive, transparent conductor paths is adhered onto this supporting glass pane.

The fastening means is a clamping element that exerts its fastening force only on the supporting glass pane of the laminated glass pane. Thus, the clamping force of the clamping elements cannot cause the delamination of the cover glass pane from the laminate of panes.

The clamping force of the clamping elements can be calculated exactly so that such laminated glass panes can also be employed with statically and dynamically loaded glass structures.

The supporting glass pane may be a hardened single glass pane or a composite of laminated glass in PVB foil with a plurality of hardened or non-hardened single glass panes.

The cover glass pane may be provided with current loads connected to the transparent, electrically conductive conductor paths. This makes it possible to provide a laminated glass pane with illuminants or sensors, for example, the illuminants being used merely for illumination or for the transmission of signals and information or merely as decorations.

Claims

1. Fastening means for laminated glass panes (2) in statically or dynamically loaded structures comprising at least one clamping element (4) by which the laminated glass pane (2) can be fastened to a supporting structure (6),

characterized in that

the laminated glass pane (2) comprises a statically and dynamically loadable supporting glass pane (8) and at least one cover glass pane (12) connected with the supporting glass pane (8) through a layer of cast resin (10), the cover glass pane being provided with electrically conductive transparent conductor paths (14), whereby the at least one clamping element (4) exerts the clamping force for fastening the laminated glass pane (2) only on the supporting glass pane (8) of the laminated glass pane (2).

2. Fastening means of claim 1, wherein the supporting glass pane (8) is a hardened single glass pane.
3. Fastening means of claim 1, wherein the supporting glass pane (8) is a composite glass laminate in PVB foil with a plurality of hardened or non-hardened single panes (8a, 8b).
4. Fastening means of one of claims 1 to 3, wherein the cover glass pane (12) comprises current loads (16) connected to the electrically conductive transparent conductor paths (14).
5. Fastening means of one of claims 1 to 4, wherein the at least one clamping element (4) has a flange portion (18) engaging behind the supporting glass pane (8).

6. Fastening element of one of claims 1 to 5, wherein each clamping element (4) is passed through a recess (9) in the supporting glass pane (8).
7. Fastening means of claim 6, wherein the at least one clamping element (4) is integrated in the laminated glass pane (2), the cover glass pane (12) covering the entire surface of the laminated glass pane (2).
8. Fastening means of claims 1 to 5, wherein the clamping element (4) holds the supporting glass pane (8) in an edge portion in which the cover glass pane (12) recedes from the supporting glass pane (8).
9. Fastening means of one of claims 1 to 5, wherein only the cover glass pane (12) is recessed in the edge portion of the laminated glass pane (2) in the area of the clamping elements (4).
10. Fastening means of claim 6, wherein the cover glass pane (12) has a larger recess (11) relative to the recess (9) and the clamping elements (4) adapted to be inserted through both recesses (9, 11) hold the supporting glass pane (8).
11. Fastening means of claim 10, wherein the clamping elements (4) terminate flush with the cover pane (12).
12. Fastening means of claim 10 or 11, wherein the gap between the clamping element (4) and the cover glass pane (12) is sealed with plastic material.
14. Fastening means of one of claims 4 to 13, wherein the current load (16) is a plurality of light emitting diodes emitting light to one or both sides.
15. Fastening means of one of claims 1 to 14, wherein the at least one clamping element (4) comprises current connection elements (20) for

current supply to the electrically conductive conductor paths (14) of the cover glass pane (12).

16. Fastening means of claim 15, wherein the current connection elements (20) protrude from the portion of the clamping element (4) facing the cover glass pane (12).
17. Fastening means of one of claims 1 to 16, wherein the clamping element (4) comprises a plurality of mutually insulated segments supplying a plurality of current connection elements (20) with current or control signals.
18. Fastening means of one of claims 1 to 17, wherein the clamping element (4) comprises a screw thread for fastening to the supporting structure (6).
19. Fastening means of one of claims 6 to 18, wherein the at least one recess (9) in the supporting glass pane (8) comprises a bevelled portion (26) adapted to a conical portion (28) of the clamping element (4).
20. Glass structure comprising a supporting structure (6) and a plurality of laminated glass panes (2) fastened to the supporting structure (6) by fastening means of one of claims 1 to 18.